

**Supplementary Information S1 (movie) | Representative time-lapse images of axonal mitochondrial motility in wild-type cultured hippocampal neurons.**

Individual mitochondria move in a saltatory manner: they stop and start, and slow down and speed up. Despite the tendency of mitochondria to reverse direction, most mitochondria undergo sustained net movement in a single direction. Approximately one-third of axonal mitochondria undergo saltatory and bidirectional movements through a combination of dynamic events. Hippocampal neurons were transfected with DsRed-Mito at DIV9, followed by ~16 min time-lapse imaging at DIV12. Time-lapse sequences of 100 frames were collected at 10-sec intervals. Movement towards the bottom indicates retrograde transport.